COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFPD 33-1, *Command, Control, Communications, and Computer (C4) Systems*. This publication outlines guidance for introducing, integrating, and supporting new communications and information (C&I) systems into PACAF. This publication does not apply to Air National Guard or US Air Force Reserve units.

1. General. Proposed communications and information systems don't always fit neatly into PACAF's operational, system, or technical architectures nor can they necessarily be maintained with available PACAF system support. This often creates problems such as strained budgets, "surprise" demands for support, new and unfamiliar systems administrator tasks, non-interoperable systems, and uncoordinated fielding schedules. This instruction establishes the PACAF process for managing the introduction of new C&I systems. A cross-functional view is key to ensuring end users can use all systems regardless of who sponsors or supports them. Additionally, this instruction will help PACAF's Chief Information Officer (CIO) execute his/her responsibilities to maintain a stable communications and information environment and to provide a sufficient communications and information infrastructure to support the PACAF warfighter.

2. New Systems Defined. This instruction applies to how PACAF will manage all new C&I systems, whether coming from outside PACAF (e.g., the Systems Program Offices (SPOs) at the Electronic Systems Center (ESC), Defense Information Systems Agency (DISA), Air and Space Command and Control Agency (ASC2A)), or originating within PACAF. Not all systems must be reviewed under this process (para **2.2.**).

2.1. A new system is one that has not previously been implemented in PACAF or is a replacement with a significant (30% or more) change in functionality. A new system must be reviewed if it meets at least one of the following criteria:

2.1.1. Has significant mission impact (determined by sponsoring user and SC).

2.1.2. Requires consideration in the POM cycle.

2.1.3. Significantly changes the PACAF systems architecture including desktop workstations or network hardware (determined by SC).

2.1.4. Will connect to the base communications network backbone or any other networked system.

2.1.5. Is developed by PACAF (units/NAFs) and has the potential to be used across PACAF and save future development costs (units/NAFs should coordinate with HQ PACAF to help them make this determination).

2.1.6. Is an Acquisition Category (ACAT) III system or higher.

2.2. Not every system needs to go through the formal review process. Systems do not need formal reviews when the proposed system:

2.2.1. Is a customized COTS application, will only be used at one site and is not intended, nor has the capacity, for use at other PACAF bases. (Units should coordinate with HQ PACAF to help them make this determination.)

2.2.2. Is an upgrade (new version), patch, or modification with less than 30% change in functionality.

2.2.3. Has minimal mission impact (determined by sponsoring user and SC).

2.2.4. Costs (development and acquisition costs) less than $10,000.00.

2.2.5. Will not connect to the base backbone or other networked system.

2.3. If there is any doubt as to whether or not a system should be considered for review, contact HQ PACAF/SC, Systems Integration Branch.

3. Integration Checklist for New Systems. The checklist in para **3.4.** is the cornerstone of this process and is synchronized with related PACOM Instructions. The purpose of this list is to provide a tool to ensure all key acquisition level, system management, and network support and interoperability issues have been considered prior to accepting and implementing a new C&I system.

3.1. These checklist items are organized under three categories: Acquisition Level, Program Management Level, and Network Support and System Interoperability:

3.1.1. Acquisition Level: The acquisition review determines if the system has completed all critical acquisition steps and that PACAF has accepted the system from the originator (SPO, NAF, etc.) and has agreed to field it. For downward directed systems, acquisition level issues are normally resolved by Air Force and Joint level SPOs prior to system release. For PACAF developed systems, this section of the checklist needs to be worked carefully. The purpose of the acquisition level review is to ensure:

3.1.1.1. PACAF has a bona fide need for the system and the system meets PACAF requirements or fulfills an Air Force or Joint requirement to be supported by PACAF.

3.1.1.2. The system fits into the PACAF architecture (compliance with the Joint Technical Architecture - Air Force (JTA-AF), Defense Information Infrastructure (DII) and Common

Operating Environment (COE) requirements).

3.1.1.3. Air Staff/SPO have adequately planned, programmed, and absorbed Initial Operational Capability (IOC) logistical costs such as spares, training, manpower, interoperability interfaces, etc., prior to fielding systems, so PACAF doesn't have to fund shortfalls out of O&M resources. PACAF must coordinate post IOC O&M funding with SPO/Air Staff.

3.1.1.4. A thorough review was completed to ensure an existing system does not already exist that can fill the requirement.

3.1.2. "Program Management" issues are theater-level, PACAF concerns and must be accomplished by HQ PACAF prior to implementation in theater. Final implementation readiness is determined by the SC and functional sponsor. Implementation approval occurs only after key PACAF program management items are in place such as:

3.1.2.1. Implementation and migration plans

3.1.2.2. System/network management and restoral plans

3.1.2.3. Security accreditations

3.1.2.4. Outage reporting plans

3.1.3. "Network Support and System Interoperability" issues involve any support levied on the Joint DII and the Defense Information Systems Network (DISN) (e.g., SIPRNET, NIPRNET) and are accomplished prior to implementation primarily by HQ PACAF/SC. SC will coordinate with DISA-PAC and HQ PACOM J6 for assistance and support. System interoperability issues involve interface/data sharing requirements with Joint and/or multinational C& I systems in the Pacific region. This review ensures:

3.1.3.1. Long-haul circuit bandwidth demands have been identified and can be supported prior to connecting AF systems into the DISN.

3.1.3.2. Adequate base level network support exists to support system bandwidth demands.

3.1.3.3. Consideration of system interface requirements and functional applicability to other Joint and coalition partners in USPACOM.

3.1.3.4. System interface requirements with NCC are defined and are in accordance with AF policy.

3.2. Some systems may not achieve 100% compliance with all items prior to acceptance. However, each checklist item must be addressed and non-compliance risks weighed and accepted by the CIO and system sponsor. The CIO and system sponsor may determine that the risk of accepting technical and logicstical shortfalls is too great and that the system should not be accepted in-theater. If the system sponsor disagrees with the CIO's assessment, the Systems Integration Council (SIC) will be the final arbitrator for acceptance.

3.3. Conditional acceptance may be allowed when every checklist item isn't approved, after the risk of non-compliance is weighed by the sponsor (usually a headquarters staff element) and the CIO's technical support staff (SC). Both will work together to complete the critical checklist items. Unresolved differences are arbitrated by the SIC.

3.4. Checklist: Use the following checklist to review all proposed new systems.

3.4.1. Acquisition Level Items. Items that must be addressed prior to acceptance into PACAF from the SPO, system's developer or owner.

3.4.1.1. Has HQ PACAF system owner/user reviewed an approved requirements document (Operational Requirements Document (ORD), Joint ORD, Needs Assessments, CSRD, etc.) or implementing directive for whether system's functionality supports PACAF's operational and security requirements? (OPR: Systems Program Office (SPO), Primary functional user; OCR: HQ PACAF/SCT)

3.4.1.2. Has satisfactory operational and technical testing, to include Security Test and Evaluation (AFSSI 5024), been completed? (OPR: ESC (technical) and HQ AFOTEC (operational), JITC (Joint Interoperability Test Center); OCR: HQ PACAF/SCM/DOI)

3.4.1.3. Does the system have Air Force and/or Joint interoperability/interface system requirements which have been identified for development? (OPR: SPO; OCR: Primary functional user, HQ PACAF/SCM)

3.4.1.4. Does the system comply with JTA-AF and DII COE interoperability standards and requirements for C&I systems? (OPR: SPO; OCR: HQ PACAF/SCT)

3.4.1.5. Has the required level of DII COE compliance been identified and does the delivered capability satisfy required level of compliance? (OPR: SPO; OCR: HQ PACAF/SCT)

3.4.1.6. Does the C&I system data comply with DoD, Joint, and/or Air Force data dictionary standards? (OPR: Systems Program Office-SPO; OCR: HQ PACAF/SCT/CSS)

3.4.1.7. Does the system requirements and implementation documentation address sufficient logistics support and life-cycle management (resource requirements such as manpower, systems administration support, spares, training plans, contractor support, funding (POM) for current year plus 5 years, licenses, etc.)? (OPRs: Primary functional user, SPO, HQ PACAF/ SCM/ SCT and/or local C&I support planner). ***See Logistics Support Checklist at Attachment 1.***

3.4.1.8. Does the system meet Year 2000 compliance? (OPR: SPO; OCR: HQ PACAF/SCM and CSS)

3.4.1.9. Is there an approved concept of operations (CONOPS) for the required C&I system? (OPR: Primary functional user and SPO; OCR: HQ PACAF/SCM)

3.4.1.10. Is the system being transferred to the operational command as an "accreditable system" per AFSSI 5024 (i.e., fully certified and ready to begin local accreditation process for full accreditation by the command functional Designated Approval Authority (DAA))? (OPR: Primary functional user, SPO; OCR: HQ PACAF/SCM/DOI)

3.4.2. PACAF Program Management and Implementation Items. Operational and security items internal to PACAF that will be addressed by HQ PACAF prior to implementation and fielding in the Pacific theater.

3.4.2.1. Is a program manager and functional Designated Approving Authority appointed in writing? (Include name, grade, organization, e-mail address, and phone number of the person appointed as program manager as well as a definition of responsibilities.) (OPR: Primary functional use; OCR: HQ PACAF/SCM)

3.4.2.2. Is the in-theater system/network manager and Computer System Security Officer (CSSO) appointed in writing? (The letter of appointment should include name, grade, organization, e-mail address, and phone number of the person appointed as the in-theater system/network manager as well as a definition of responsibilities.) (OPR: Primary functional user; OCR: HQ PACAF/SCM/DOI)

3.4.2.3. Has a System/Network Management Plan and security policy been developed that identifies required base LAN support and security measures to protect the LAN from intrusion through the system? (OPR: HQ PACAF/SCM; OCR: Primary user community, HQ PACAF/DOI)

3.4.2.4. Does this system/network replace an existing system/network? If so, is there a migration plan from current systems/networks to new systems/networks? (OPR: Primary functional user, HQ PACAF/SCM)

3.4.2.5. Is there a System Implementation Plan to include items such as installation schedule, funding and resources? (OPR: Primary functional user; OCR: HQ PACAF/SCM)

3.4.2.6. Are daily operations procedures established (including management process and management resources required)? (OPR: Primary functional user; OCR: HQ PACAF/SCM)

3.4.2.7. Does system/network topology demonstrate redundancy (survivability and system failure protection), such as secondary routers, servers, etc.? Redundancy requirements should be determined by criticality/availability assignments. (OPR: Primary functional user; OCR: HQ PACAF/SCT)

3.4.2.8. Has a DAA been assigned to ensure security requirements are being met (in accordance with DoD 5200.28-D and AFSSI 5024)? (OPR: Primary functional user; OCR: HQ PACAF/DOI/SCM)

3.4.2.9. Is there a security/risk assessment (as required by AFSSO 5024) for the type system/network to include highest system/network security level and any restrictions imposed? (OPR: Primary functional user; OCR: HQ PACAF/SCM/DOI)

3.4.2.10. Is there a signed DAA accreditation letter authorizing system operation (interim or final approval to operate based on the requirements specified in AFSSI 5024)? (OPR: Primary functional user; OCR: HQ PACAF/SCM/DOI)

3.4.2.11. For systems requiring COMSEC (CRYPTO) materials prior to operation, has a sub-account been established with the Base COMSEC Custodian? (OPR: Primary functional user; OCR: HQ PACAF/SCM/DOI)

3.4.2.12. Are there security waivers for new or existing systems/networks, if necessary? (OPR: Primary functional user; OCR: HQ PACAF/ DOI/SCM)

3.4.2.13. Did the system OPR coordinate with the base or MAJCOM Records Manager to ensure records management requirements were met (as prescribed in DoD-STD-5015.2, Design Criteria Standard for Electronic Records Management, and AFMAN 37-123, Management of Records)? (OPR: Primary functional user; OCR: HQ PACAF/SCT)

3.4.2.14. Have criticality and availability ratings been assigned? (OPR: Primary functional user; OCR: HQ PACAF/SCM)

3.4.2.15. Has a System Restoral Plan been developed to meet criticality and availability categories assigned? (OPR: Primary functional user; OCR: HQ PACAF/SCM)

3.4.2.16. Has an Outage Reporting Plan been developed and coordinated with the Communication's Squadron Control Center identifying to whom and when to report system outages? (OPR: Primary functional user; OCR: HQ PACAF/SCM and CSS)

3.4.2.17. Will the system support any PACAF OPlan? If so, has it been identified in the plan? (OPR: Primary functional user; OCR: HQ PACAF/SCM/SCT)

3.4.2.18. Are existing facilities able to support the system to be fielded? If not, has the necessary facility work been identified, approved, and funded within an appropriate program? (OPR: Primary functional user; OCR: HQ PACAF/CEP/SCM). *See para A1.2.7.*

3.4.3. Network Support and Interoperability. Must be addressed prior to system implementation.

3.4.3.1. Has DISA PAC been coordinated with for DISN and off-base circuit/bandwidth requirements, to include Host Nation Approvals (HNA) for connectivity with foreign allies? (OPRs: HQ PACAF/SCM; OCR: Primary functional user)

3.4.3.2. Are circuit capacity and funding resources available to support criticality/availability requirements of the system? (OPR: Primary functional user; OCR: HQ PACAF/SCM)

3.4.3.3. For systems requiring SIPRNET connection, has an accreditation package been sent to DISA PAC (info copies to HQ PACAF/SCM/DOI) for approval to connect? (OPR: Primary functional user; OCR: HQ PACAF/SCM/DOI)

3.4.3.4. Has there been an impact assessment on DISN and base level networks (i.e., bandwidth demands)? (OPR: HQ PACAF/SCM; OCR: Primary functional user)

3.4.3.5. Have service level agreements and/or contracts been established for systems that cross Service infrastructure (i.e., an AF GCCS server supporting a USN GCCS client) and provide end-to-end support? (OPR: HQ PACAF/SCM; OCR: Primary functional user)

3.4.3.6. Are there USCINCPAC overall theater criticality/availability ratings for the system/network? (OPR: Primary functional user; OCR: HQ PACAF/SCM)

3.4.3.7. Does the system have Joint and/or multinational interoperability/interface system requirements which have been identified for development? (OPR: System SPO; OCR: Primary functional user, HQ PACAF/SCM)

4. Process Flow. New systems flow through the review process as described below and as depicted in **Figure 1.**.

4.1. Systems may be proposed from multiple levels including AF or Joint Program Offices, MAJCOMs, NAFs or Wings.

4.2. General. The PACAF Command and Control Working Group (C2WG), non-C2 functional users, and SC staff will review new systems using the checklist in section 3.4.

4.2.1. The C2WG makes their recommendations to the Command and Control Steering Group (C2SG) for C2 Systems.

4.2.2. The non-C2 systems functional users review support systems and make their recommendations to the Systems Integration Steering Group (SISG).

4.2.3. Both steering groups make their recommendations to the HQ PACAF Systems Integration Council (SIC). The SIC has final approval and arbitration authority for accepting new systems into PACAF.

4.3. Systems Acceptance Into PACAF. Checklist items in para **3.4.1.** help determine how well critical acquisition level items have been satisfied by the SPO prior to system acceptance into PACAF. Systems developed or acquired by Wings or NAFs may not have accomplished many of these items, but each must be at least addressed prior to implementation in PACAF.

4.3.1. The functional sponsor (for non-C2 support systems) and the C2WG (C2 Systems) evaluate items in para **3.4.1.** with a focus on mission needs, logistics support, releasability, interoperability requirements, funding, manpower, etc.

4.3.2. SC evaluates items in para **3.4.1.** with a focus on technical issues including system and technical architecture compliance (COE/DII compliance, JTA-AF), hardware/software and infrastructure support, and risks associated with accepting systems with unresolved technical and logistical support discrepancies.

4.4. C2 Systems and Non-C2 (Support) Systems Reviews.

4.4.1. The C2WG and C2SG, chaired by DOQ, coordinate C2 requirements (MNS, ORDs, etc.) and proposed solutions.

4.4.2. Non-C2 requirements and solutions are sponsored by a PACAF functional area (LG, SG, CE, etc.) through the coordination process and are coordinated with the SISG, which is chaired by SC (acting as the PACAF CIO).

4.4.3. The C2SG and the SISG are the first review levels. Both steering groups focus on the following:

4.4.3.1. Cross functional issues.

4.4.3.2. Ensuring integration and support plans are acceptable.

4.4.3.3. System functionality isn't unnecessarily or unintentionally duplicated.

4.4.3.4. Endorsing working-group-level reviews.

4.5. Steering Group Recommendations.

4.5.1. The SISG chairman makes a system acceptance recommendation to the SIC for all non-C2 systems.

4.5.2. The DO makes the system acceptance recommendation to the SIC for all C2 systems.

4.5.3. The SIC arbitrates disagreements and is the final authority for accepting or rejecting all new support and C2 systems.

4.5.3.1. If a system is rejected for acceptance into PACAF by the SIC, the system developer/owner (SPO, Air Staff) is notified of areas of concern. The SIC will identify risk of fielding system without fixing areas of concern and may request that developer/owner delay fielding system until concerns are addressed. If the SIC is given no choice by developer/owner to field the system in PACAF, the SIC will ensure developer/owner is aware of risk level PACAF is

being directed to accept.

4.5.3.2. System rejection resolution. Once the deficiencies that caused rejection are resolved by the developer, the system may be reconsidered through the process or directly by the SIC chairman (provided all discrepancies are resolved).

4.6. System Implementation In-Theater. Once the SIC accepts a system, it enters the implementation phase.

4.6.1. Upon system acceptance by the SIC, the sponsor and SC staff form a partnership and complete the implementation actions from paragraphs **3.4.2.** and **3.4.3.**.

4.6.2. If checklist items aren't completely resolved but conditional implementation is allowed, SC helps the sponsor satisfy critical system management items and work on the remaining items (e.g., interim security accreditations until full accreditation). Both SC and the system owner will notify the SIC when:

4.6.2.1. Critical resource shortfalls or operational issues that require SIC support or resolution are identified.

4.6.2.2. When system implementation is completed.

Figure 1. HQ PACAF Process Flow Diagram For Acceptance, Integration And Implementation Of New Systems.
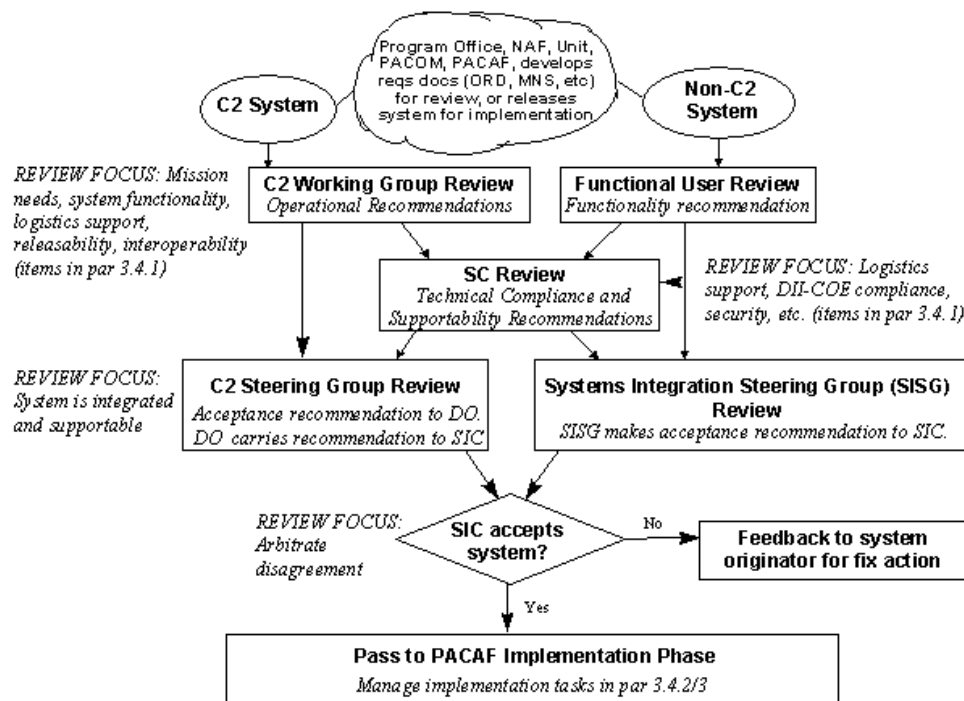
BERNARD K. SKOCH,   Colonel, USAF
Director, Communications and Information

Attachment 1

INTEGRATED LOGISTICS SUPPORT CHECKLIST FOR ASSESSING YOUR PROGRAM/SYSTEM

A1.1. MAJCOM Responsibilities:

A1.1.1. Use this attachment to review the ILS elements and supportability and readiness concepts in developing operational and logistics requirements. This checklist provides a comprehensive guide to a broad range of logistical concerns. **Not all items apply to all systems. The user/owner of the system must determine which items apply to their system.**

A1.1.2. Address and accept trade-offs between a system's various supportability and operational requirements.

A1.1.3. Tailor and refine ILS requirements throughout the system acquisition process to describe a viable support concept for the system.

A1.1.4. Define qualitative and quantitative operational Reliability, Maintainability and Deployability (RM&D) thresholds and objectives as precisely as possible.

A1.1.5. Continually refine RM&D parameters throughout the acquisition process as the overall system design matures.

A1.1.6. Integrated Logistic Support Management Teams (ILSMTs) address each of the ILS elements and carry out the actions associated with each element.

A1.2. Integrated Logistics Support (ILS) Elements:

A1.2.1. Design Interface . Integrates the logistics-related readiness, combat capability, and supportability design parameters into system and equipment design parameters:

Reliability, maintainability, and deployability.	Availability.
Sustainability.	Survivability.
Standardization and interoperability.	Integrated diagnostics effectiveness.
Fuel, utility and energy management.	Transportability.
Testability.	Accessibility.
Dependability.	Spares support.
Transportability.	Mission effectiveness.
Durability.	Serviceability.
Software reprogrammability.	Software speed and efficiency.
Level of repair.	Calibration.
Industrial support base.	Revised tactics.
Support equipment.	Training.
Inspections.	Manpower.

Human factors.   System safety.

Corrosion.   Nondestructive inspection.

Physical obsolescence.   Changes in threat environment.

Hazardous material management.   Mobility.

A1.2.2. Maintenance Planning.   Addresses the requirements and constraints inherent in on-equip-ment, organizational off-equipment, and off-equipment maintenance for operational and supporting commands. Considers the entire life cycle of the system, including its requirements during peacetime, wartime, and other contingency scenarios. Describes the operational maintenance environment for the total (scheduled and unscheduled) maintenance effort, including: basing concept; expected weather and climate (consider all weather to accommodate mobility); and acceptable frequency and repair times including ease, accessibility, and troubleshooting.

A1.2.2.1. Specify levels and organizations responsible for maintenance. Evaluate two levels of maintenance as a design, development, and contracting goal in all acquisition programs to the extent repair level analysis and logistics support analysis data and program management action support such a decision. Specify an acceptable interservice, organic, or contractor mix. Ensure that planning includes contractor participation in fielded operations if contractor support is antici-pated.

A1.2.2.2. List the generic type of maintenance tasks these organizations will perform. Include workload and time phasing for depot maintenance requirements. Consider the use of organic depots for modifying fielded systems. Assess the need for, or intention to perform, centralized repair at selected operating sites or at safe areas. Include requirements for battle damage repair. Address maintenance constraints posed by requirements for:

A1.2.2.2.1. The physical make-up of the equipment.

A1.2.2.2.2. Electronics.

A1.2.2.2.3. Chemicals.

A1.2.2.2.4. Nuclear hardness.

A1.2.2.2.5. Survivability.

A1.2.2.2.6. Safety.

A1.2.2.2.7. Occupational health.

A1.2.2.2.8. Environment. Include requirements for demilitarization and redistribution. Express the requirement for a tailored logistics support analysis (LSA) according to MIL-STD-1388-1A/2B. When drafting this analysis:

A1.2.2.2.9. Define, develop, and influence supportability-related design factors.

A1.2.2.2.10. Ensure that personnel develop and field a fully integrated system support struc-ture at the same time as they field the prime mission equipment. In the LSA process, consider requirements for:

A1.2.2.2.10.1. Spares.

A1.2.2.2.10.2. Technical orders.

A1.2.2.2.10.3. Support equipment.

A1.2.2.2.10.4. Special facilities.

A1.2.2.2.10.5. Skill levels.

A1.2.2.2.10.6. Specialized training.

A1.2.2.2.10.7. Security Clearances.

A1.2.2.2.10.8. Other pertinent ILS areas. Where appropriate, consider compatibility with systems that transmit on-aircraft or system faults to base-level management information systems. Consider using expert systems to help reduce data and filter fault data down to a manageable level. **NOTE:** Such expert systems also carry a full range of ILS requirements that you must address. The software support concept can affect significantly both mission capability and system operating and support costs. If you require changes to software:

A1.2.2.2.11. Consider how to implement them at the operational unit level and what manpower, training, equipment, and documentation you need to accomplish the task.

A1.2.2.2.12. Ensure that all reprogrammable items in the end item have as many of the same design interfaces as possible for uploading new or changed software. When possible, ensure that all items share the same protocols, data buses, architecture, power levels, pin connections, connector types, and so on.

A1.2.2.2.13. Consider ways to distribute software changes.

A1.2.3. Support Equipment (SE). SE includes:

A1.2.3.1. Transportation, ground handling and maintenance equipment.

A1.2.3.2. Munitions maintenance equipment.

A1.2.3.3. Special and common tools.

A1.2.3.4. Metrology and calibration equipment.

A1.2.3.5. Test and diagnostic equipment.

A1.2.3.6. Software support and reprogramming equipment.

A1.2.3.7. Automatic test equipment.

A1.2.3.8. Computer programs. Consider Impacts when designing and modifying SE. Correlate the SE requirement with the maintenance concept and identify SE development constraints. Ensure that the SE is supportable and meets the timing and calibration requirements necessary to maintain the systems. Standardize equipment or make it compatible with other systems or equipment. Consider a design that incorporates common support equipment. Schedule SE development in phases that correlate with the development of the prime mission equipment, when possible. Specify SE design limitations and requirements, such as:

A1.2.3.8.1. RM&D parameters.

A1.2.3.8.2. Size, weight, and power.

A1.2.3.8.3. Complexity, safety, and calibration.

A1.2.3.8.4. Test tolerance consistency and self-test features.

A1.2.3.8.5. Required manpower skills and levels.

A1.2.3.8.6. Repair tools.

A1.2.3.8.7. Climatic operational environment.

A1.2.3.8.8. Equipment performance, mobility, transportability, service life, and user operational test and evaluation (OT&E). Determine warranty requirements for SE under development and SE undergoing modification, if appropriate. Explain any preference for using SE instead of built-in test and integrated diagnostics within the mission equipment design. Indicate whether to accept commercial off-the-shelf equipment. Consider:

A1.2.3.8.8.1. Integrated test and diagnostic software.

A1.2.3.8.8.2. Download capabilities for both software and hardware. Base the decision either to deploy standard SE for each subsystem at remote operating locations or develop integrated SE capabilities for the weapons systems. Consider what equipment and software tools will be needed for software support, including support equipment that sends and receives software changes. Use the existing and planned tools whenever practical. When possible use the same tools that were used during software development. Consider the impact of support equipment availability on:

A1.2.3.8.8.2.1. The force structure of large active duty units.

A1.2.3.8.8.2.2. Squadrons split due to mobilization.

A1.2.3.8.8.2.3. Smaller, geographically separated Air Reserve Component (ARC) units. (For example, active-duty fighter wings of 72 aircraft often have two pieces of support equipment for three aircraft squadrons. When those three squadrons move to three separate ARC locations, only two can take SEs with them.)

A1.2.3.8.8.3. Develop firm requirements and goals for reducing the impact of support equipment on:

A1.2.3.8.8.3.1. Deployment footprints.

A1.2.3.8.8.3.2. Logistics support tails.

A1.2.3.8.8.3.3. Logistics system infrastructure vulnerabilities.

A1.2.3.8.8.4. Consider the need for SE to conduct non-destructive inspections and oil analyses. Consider special SE needs for space systems such as tools to repair a satellite while on orbit.

A1.2.4. Supply Support.   Specify the importance of the sparing concept to RM&D requirements as documented in the Logistic Support Analysis Record (LSAR) taking into account: peacetime and wartime operations and maintenance concepts; and primary operating stocks and readiness spares support concepts.

A1.2.4.1. MAJCOMs define wartime assignments based on RSPs and IRSPs in terms of:

A1.2.4.1.1. Deployability (deployment footprint and associated support tail).

A1.2.4.1.2. Maintenance concepts.

A1.2.4.1.3. Operations tempo.

A1.2.4.1.4. Days of support without re-supply.

A1.2.4.1.5. Peculiar mission requirements of each organization.

A1.2.4.2. Single Managers (SM's) develop a provisioning strategy and plan that balances best value, producibility, reliability, the industrial base, procurement lead times, availability of vendor provided spares, and the adequacy of commercial data needed to identify replacement parts. Consider these factors when planning for:

A1.2.4.2.1. Pre-operational spares support.

A1.2.4.2.2. Government and contractor-furnished equipment programs.

A1.2.4.2.3. Direct purchase, breakout, and competition.

A1.2.4.2.4. Data acquisition.

A1.2.4.2.5. Initial and replenishment provisioning.

A1.2.4.2.6. Contractor support.

A1.2.4.3. SM's ensure adequate funding for:

A1.2.4.3.1. Provisioning technical documentation.

A1.2.4.3.2. Spares acquisition integrated with production.

A1.2.4.3.3. Reprocurement data that support competitive replenishment spares acquisition.

A1.2.4.3.4. Long-term spares support for nondevelopmental or commercial off-the-shelf items.

A1.2.4.4. MAJCOMs and SM's consider energy requirements in system design, especially systems operated under austere conditions in deployed locations. Consider requirements for:

A1.2.4.4.1. Stand-by emergency power.

A1.2.4.4.2. Liquid oxygen or nitrogen.

A1.2.4.4.3. Hydraulic fluids.

A1.2.4.4.4. Electricity.

A1.2.4.4.5. Multi-fuel and synthetic fuel.

A1.2.4.4.6. Energy storage.

A1.2.5. Packaging, Handling, Storage, and Transportation (PHS&T). Specify PHS&T requirements to ensure that personnel package, transport, preserve, protect, and properly handle all systems, equipment, and support items. Consider:

A1.2.5.1. Geographical and environmental restrictions.

A1.2.5.2. Electrostatic discharge-sensitive and hazardous materiel PHS&T requirements.

A1.2.5.3. Standard handling equipment and procedures. Specify development and procurement plans for systems, equipment, and munitions so that existing or programmed commercial or military transportation facilities can accommodate their gross weights and dimensions. Require a

search of the Container Design Retrieval System for suitable existing containers before developing new ones. Minimize the deployment footprint, particularly for outsized airlift. For equipment approaching the dimensions of an international standards organization (ISO) container, specify design and building requirements so that individual or mated ISO containers can accommodate the equipment. Packaging, Handling, Storage, and Transportation Factors are:

Transportability criteria.	Gross weight and dimensions.
Sectionalization.	Standardization requirements.
Requirements for special permits.	Shelter and van requirements.
Airlift requirements.	Packaging protection levels.
Highway standards.	Transportability test requirements.
Safety.	Environmental criteria and constraints.

Fragile, sensitive, or hazardous material requirements.

A1.2.5.4. Clarify mobility, deployability, and transportability requirements. For example, specify maximum allowable cubic dimensions per load or pallet and maximum number of loads or pallets to support the design reference mission profile. Calculate pallet dimensions to ensure that airlift is flexible and compatible with available logistics transportation within theaters of employment. Specify the maximum time permitted to prepare for deployment and set up on arrival (consider both movement preparation and assembly time) at austere and improved sites, if applicable. Many items, such as tactical shelters, large vehicles, and aerospace ground equipment, require extensive preparation and reassembly times. State requirements for specialized (environmental), internodal, or tactical shelter containers and container handling equipment to support mobility operations. If mobility is required, specify the requirement and identify limitations. For example, state that personnel must be able to transport an item in fielded military design vehicles or airlift them in road mobile configuration. For missiles, munitions, and other items as appropriate, address:

A1.2.5.4.1. Shelf life.

A1.2.5.4.2. Service life.

A1.2.5.4.3. Quantity-distance criteria.

A1.2.5.4.4. Other storage, mobility, and transportation characteristics, such as how to reprogram missiles stored in containers and loaded on aircraft. Consider alternatives that could improve PHS&T efficiency, such as system or subsystem design modularity and standardization.

A1.2.6. Technical Data:

A1.2.6.1. Describe unique requirements for developing and distributing technical data. Ensure that the requirements for technical data match the maintenance concept. Require delivery of digital data to satisfy computer-aided acquisition and logistics support (CALS) initiatives and standards according to MIL-STD-1840B and MIL-R-28002B. Consider using automated technical orders when feasible. Require delivery of data on aperture cards or paper only when this method is more economical. Validate and verify technical data to support, operate, and maintain systems and equipment in the required state of readiness. Evaluate commercial manuals or technical data

from other services, if appropriate, and decide whether these give adequate information. Consider backup methodologies for archiving technical data to protect it from destruction during disasters.

A1.2.7. Facilities:

A1.2.7.1. Consider the full spectrum of Air Force facility engineering responsibilities, including:

A1.2.7.1.1. Environmental analysis.

A1.2.7.1.2. Programming.

A1.2.7.1.3. Design.

A1.2.7.1.4. Facility acquisition.

A1.2.7.2. Identify the facility constraints, including support facility requirements that may apply. Specify whether the system or equipment needs new facilities or must be designed to fit existing facilities. Give specific utility requirements. Identify the impact of the new facility on existing facilities including airfield pavements. Minimize the combat support structure's vulnerability to attack by reducing the number and size of new facilities needed by the system. Consider explosives hazards and site licensing requirements, as applicable.

A1.2.8. Manpower and Personnel:

A1.2.8.1. Specify both quantitative and qualitative manpower requirements. Establish personnel requirements based on operations and support tasks, their frequency, and the planned future force structure. Specify:

A1.2.8.1.1. Number of manpower authorizations.

A1.2.8.1.2. The desired mix of officers, enlisted personnel, civilian employees, Air Reserve technicians, and contractors.

A1.2.8.1.3. The Air Force specialty code structure.

A1.2.8.1.4. The desired distribution of skill levels.

A1.2.8.1.5. Sources of specialists.

A1.2.8.1.6. The facility's projected impact on the draw-down system.

A1.2.8.2. Manpower and personnel requirements encompass:

A1.2.8.2.1. Wartime scenarios.

A1.2.8.2.2. Projected manpower budgets.

A1.2.8.2.3. System training plans.

A1.2.8.2.4. Potential safety and health hazards.

A1.2.8.2.5. The effect of planned work loads on operators and maintenance personnel (including software support personnel) in the operational environment. AFI 63-117, Integrated Manpower, Personnel, and Comprehensive Training and Safety (IMPACTS) Program, provides a framework to address and integrate all the human elements of manpower, personnel, training, safety, and health. Each IMPACTS element affects weapon system cost, schedule, design, and performance.

A1.2.9. Training and Training Support:

A1.2.9.1. Specify the training concept to include:

A1.2.9.1.1. Operator, and maintenance training.

A1.2.9.1.2. Its relationship to training for existing systems.

A1.2.9.1.3. Using mockups, and training aids.

A1.2.9.2. Emphasize the need to establish a multicommand training and planning team and pre-pare a life-cycle training development plan according to AFI 36-2201. Coordinate scheduling with MAJCOMs and Headquarters Air Education and Training Command (AETC), to ensure that using and maintenance personnel (including software support personnel) receive training when the equipment arrives onsite.

A1.2.9.3. Address training needs, including:

A1.2.9.3.1. Civilian (depot), active duty, and reserve personnel training.

A1.2.9.3.2. Individual training.

A1.2.9.3.3. New equipment training.

A1.2.9.3.4. Initial, formal, and on-the-job training.

A1.2.9.4. Develop a training program that:

A1.2.9.4.1. Integrates weapon system design, operational concepts, employment environ-ments, and current maintenance concepts.

A1.2.9.4.2. Encompasses the full training spectrum, including on- and off-equipment mainte-nance at all applicable maintenance levels.

A1.2.9.4.3. Uses the Air Force standard system for computer-based training.

A1.2.9.4.4. Addresses training for personnel with site activation and initial cadre responsibil-ities. Includes training to support: organic course development; development tests and evalu-ations.

A1.2.9.4.5. Initial operational test and evaluation team training requirements. Identify respon-sibilities of the Air Force and the contractor for developing and conducting each phase of training. Consider structuring annual training courses for ARC members who have limited time available. Include required training equipment for inventory items, prime-mission equip-ment, support equipment, and training devices.

A1.2.9.5. Address:

A1.2.9.5.1. Logistics support for training equipment and devices.

A1.2.9.5.2. Projected equipment type, number, required location , and interim training sup-port provisions.

A1.2.9.5.3. Additional facility or manpower requirements necessary to support projected training and training devices.

A1.2.9.5.4. Impacts application and warranty considerations when designing and modifying training equipment.

A1.2.10. Computer Resources Support:

A1.2.10.1. Consider system requirements and design constraints within the context of the support concepts.

A1.2.10.2. Describe specific requirements and constraints pertaining to computer programs and associated documentation, related software, source data, facilities, hardware, firmware, manpower, personnel, and other factors required to operate and support mission-critical computer systems. Make sure that the system can support and use the software in the operational environment when the system is delivered.

A1.2.10.3. Specify the level of MAJCOM involvement and control of mission software and data. Identify requirements for configuration management and software quality control for using and supporting commands. Consider using spare memory loader verifiers (MLV), memory storage media, and blank or programmed firmware devices to accommodate multiple software configurations to meet mission requirements. When appropriate and cost effective, consider a one-time, lifetime buy of micro-circuits if reasonably certain that the specific technology will become obsolete within a system's lifetime. Outline required interfaces. Include message formats for data sharing between systems, human-machine interfaces, and interaction among subsystems. Identify other systems that may need to adapt to new requirements. If feasible, consider identifying standardized interfaces across various weapon systems to enhance the operations and support efficiency. Specify interfaces to the Automatic Digital Network, Defense Data Network, or other networks. Identify requirements for:

A1.2.10.3.1. Spare memory.

A1.2.10.3.2. Spare throughput.

A1.2.10.3.3. Computer memory growth.

A1.2.10.3.4. Software partitioning.

A1.2.10.3.5. Modular design.

A1.2.10.3.6. Software module size.

A1.2.10.4. Outline constraints such as operating environment, package limitations, standards (including higher order language, architecture, modularity, and MLV), required reliability, separation of mission data from the operating systems, and partitioning required to meet operational needs. Specify required reaction times for all support agencies. Indicate how long agencies have to respond after receiving change requirement notices and before receiving software or firmware changes by operational unit. Specify maximum time allowed between software updates, corollary test program set updates, and automatic test equipment updates. Specify requirements for reprogramming software. Specify when personnel need to upload software in all of an end item's reprogrammable components for peacetime and wartime configurations. Address requirements for:

A1.2.10.4.1. Computer system security.

A1.2.10.4.2. Sensitive information protection.

A1.2.10.4.3. The integrity of critical processing.

A1.2.10.4.4. Support software such as compilers, simulators, emulators, and software development or support tools.

A1.2.11. The Logistics Management section of HQ PACAF SCMB was established to help PACAF Bases better define their Communications and Information Systems Logistic requirements (theater tailoring) and to provide consultation on related shortfalls. This checklist was established to create a focus for customer logistics concerns and improvements to system support tails.